

The "Rooster Tail Azurite" from Tsumeb, South West Africa. The dark blue crystals are six inches long and are semi-transparent. This is perhaps the finest azurite specimen on display in the Museum in recent years. A Roebling Collection number on the bottom of specimen shows this azurite was in the collections of the Smithsonian Institution.



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Summer Sallies

The Summer Sallies program, a benefit for Museum member's children from first through sixth grade, has enjoyed another smashing success.

The sessions took place on July 16, 18, 23, and 25, morning and afternoon. The basic philosophy behind the summer programs is the hope that each child will have taken home some basis for a continuing interest in the field he or she has studied.

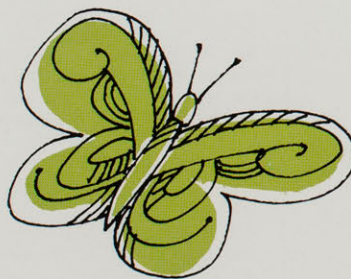
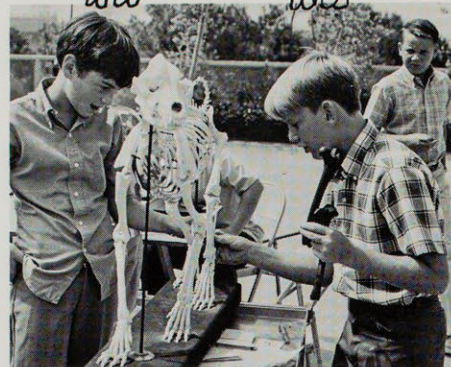
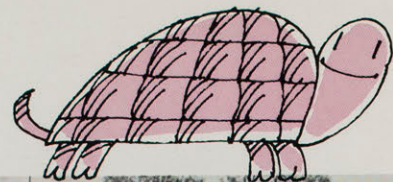
Each child worked in one of five given areas, Entomology, Ichthyology, Paleontology, Mineralogy or Herpetology. They studied with a curator in a given field and were truly oriented in the subject.

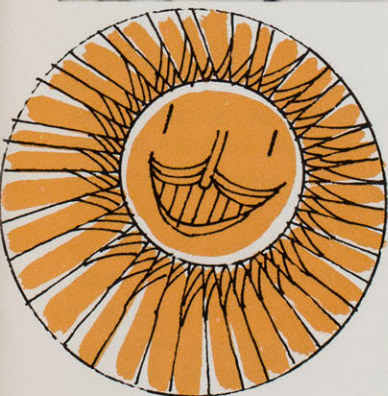
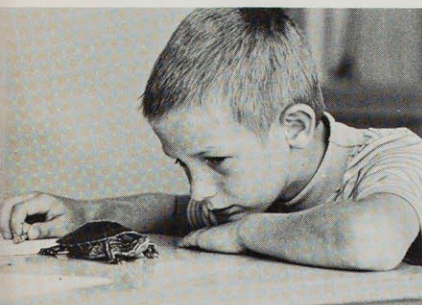
For instance, if the subject was Ichthyology, the child learned about parts of the fish by dissection. He discovered the ecology of the fish by actually building an aquarium.

In Paleontology the children learned how the Museum uses fossils; they went on a fossil field hunt. They learned how to preserve what they brought back. Mold casting of fossils was taught.

Audio-visual techniques were employed, with a series of films used with classes that came in alternately.

Parents who attended with their children were treated to an educational bonus of their own. They were both educated and entertained by Museum Docents on a Flying Carpet Tour of the Museum, in the hope that they, the parents, would learn to take their own children through the Museum intelligently.





Curiosity. Cultural pride. Concern. These elements, perhaps more than any others, are common denominators among Museum Alliance members.

The degree to which any single factor may motivate one to become a member will vary with human individuality. And the values that one derives from membership are even more varied than the Alliance activities depicted here.

But no matter what set of interests bring a person to membership, he or she is ever deserving of thanks. The most important result of their interest is the continuing growth of the Museum's collections and its stature as a research institution.

While it is not possible to individually recognize each of the more than 5,000 members of the Alliance, we can and do want to give special thanks to these Life and Sustaining members, whose commitment to the Alliance is particularly great.

We gratefully acknowledge our many other members who so regularly and dependably maintain their memberships. We hope in future issues to publically express our appreciation.

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QUARTERLY

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TOBACCOS AND SNUFFS

Indian smoking.
Thevet's Singularitez
Paris, 1558.



*"For thy sake, Tobacco, I
would do any thing but die."*

A Farewell to Tobacco
Charles Lamb

*"...in the black stinking fumes thereof
nearest resembling the horrible Stygian
smoke of the pit that is bottomless."*

Counterblasts to Tobacco
1604 King James

by William A. Emboden, Jr.
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On the north coast of Cuba, only a few miles from Antilla is the city of Gibara where Columbus landed on November 5, 1492. The esteemed Admiral sent several of his men, laden with gifts, into the interior where lived the king of these people. Hoping to be regaled with stories of gold and jewels, one can imagine his astonishment when the Spaniards returned, not with jewels, but with tales of men and women inserting into their nostrils smouldering rolls of leaves which they called **tobacos**. These **tobacos**, which we would call cigars, were inserted in one nostril, ignited with a firebrand and inhaled two or three times. It is hard to imagine that within a few decades there were more Spaniards converted to smoking than Indians converted to Christianity. Similarly, when British navigators attempted to settle Virginia, they found the Indians smoking cigars, pipes, and chewing and snuffing. So fascinated was Sir Walter Raleigh, one of these navigators, that he took an Indian, pipes and tobacco, back to London. The plant taken to England was a low growing glandular herb bearing clusters of yellow-green flowers: we now know this plant as **Nicotiana rustica**, decidedly inferior to the tobacco smoked today.

Tobacco conquered the English as

surely as it had the Spaniards, and soon the London Company was sending African slaves to Virginia to cultivate and harvest the weed. However, it was not the **N. rustica** which was grown, but a Brazilian cousin **Nicotiana tabacum**, a taller plant growing from a basal rosette of glandular leaves and terminating in a cluster of tubular pink flowers. In order to grow this crop, many slaves agonized in clearing the dense forests that covered Virginia and part of Maryland. A tobacco aristocracy grew rapidly so that by 1640 the annual export to England was over 1 million pounds to satisfy the demands of almost 7,500 tobacco shops in London alone. At the time of the American revolution, debts of colonial planters to British firms ran into several millions of dollars; a debt which was later to be settled for a fraction of the amount owed. Among the tobacco aristocracy were Thomas Jefferson and Patrick Henry.

The rapidity with which **N. tabacum** spread throughout the world was not only because of its pleasant stupefying qualities, but because like other plants before it, tobacco was said to have potency as an aphrodisiac. Sailors told of the women of Nicaragua who smoked the weed and displayed an ardor undreamed of. It was probably this rumor which cinched the popularity of smoking among

the women of Europe. Perhaps this was the reason why an ex-Franciscan monk, André Thevet experienced such success in introducing tobacco to the French court in 1579. Thevet brought seed from what is now Rio de Janeiro to France in 1556. It was known by the Brazilians as *petun* or *petum* and was the tall pink flowered *N. tabacum*. In a volume, which for reason of its 19 word title is best known as *Singularitez*, Thevet published an account of his introduction of the plant, and cast aspersions on an unnamed individual who claimed to have introduced this plant at an earlier date, and further had the audacity to give it his name. The culprit referred to was Jean Nicot, French Ambassador to Portugal who had brought from the King's prison in Portugal an herb of unusual properties recently introduced from Florida. This plant could reputedly, if snuffed up the nose, relieve severe headaches. A gift of powdered leaves and seed was sent by Nicot from his garden to Catherine de Medici in 1560. Catherine, who judging from her active life probably suffered from more than headaches, espoused the virtues of the powder. However, it was not the tobacco of Thevet that Nicot introduced to the Queen, but its close relative *N. rustica*. Ultimately it was the contribution of Thevet which was to conquer France, not the weed of Nicot. A battle of words over primacy of introduction ensued and Nicot, having considerably more status than Thevet, published with several other scholars in 1573 a dictionary in which is to be found this entry:

"Nicotaine: an herb of marvelous virtue against all wounds, ulcers, face ulcers and similar things, which M. Jean Nicot, Ambassador to the King of Portugal, sent to France and from whom it has derived its name."

Linnaeus, in his binomial system, probably consulted this entry when dubbing all of the tobaccos and their relatives with the generic epithet, *Nicotiana*. Thevet seems to have suffered an injustice in this appellation, but the harm seems slight if one considers Spanish volumes which predate both of these individuals in speaking of tobacco and its uses (fide, Oviedo's *General History of the Indies*, 1547). The contributions of the two Frenchmen were qualitatively

different, for the purported medicinal value of *N. rustica* was the primary reason for its introduction, while *N. tabacum* enjoyed a popularity predominantly as a plant to be smoked or taken as a snuff with no medicinal intent. It is the *N. rustica* of Nicot which is today used in making poisons such as insecticides.

Tobacco consumption by pipe, cigar, and as a snuff was spread widely shortly after its introduction into Europe. It was not until the states of Western Europe fought the Crimean war that they adopted the habit of cigarette smoking which has subsequently surpassed all other usages in popularity. The present order of world preference is: cigarettes, pipe tobacco, cigars, chewing tobacco and lastly snuff. Most of these represent a blend of Turkish and oriental tobaccos with the milder American tobaccos. While Europeans may credit themselves with domestication of tobacco, the inability of *N. tabacum* to persist in the absence of cultivation suggests that the plant has a history of domestication at least as ancient as maize. This is not true of *N. rustica* which still grows wild in parts of eastern United States. Nicotianas hybridize fairly easily, and it has been suggested from chromosomal studies that *N. tabacum* may have hybrid origins.

In overall tobacco production, the United States leads the world and yet cigarettes produced here represent a blend of tobaccos all of which cannot be produced in this country. Notably, the small leaved Turkish tobaccos which add a certain musky quality. Soils, climate, varieties, curing and additives all influence the ultimate product. Like the production of wine grapes, certain areas of the world produce a product which cannot be duplicated elsewhere; for example Vuelta Abajo in Cuba produces a cigar tobacco which is unparalleled, while Java and Sumatra produce the finest leaves for use as cigar wrappers. Tobacco destined for smoking has added to it *perique*, a specially processed tobacco product from St. James Parish in the Mississippi Delta. *Perique* is made by alternately pressing juice from tobacco leaves and allowing it to be reabsorbed. Over a period of several months there is produced a strong black tobacco unlike any other. Among additives to smoking and chewing tobaccos may be, oil of

hops, sugar, licorice, glycerine, concentrate of cider, coumarin and rum. Such a list reads more like an Indian gourmet recipe than ingredients of blended tobacco.

Tobacco culture is too elaborate a procedure to discuss in a brief treatment, but suffice it to say that *Nicotiana tabacum* is one of the touchiest plants in cultivation, being extremely susceptible to a host of diseases and environmental fluctuations. Not only are growing conditions critical, but in order to produce large glandular leaves of quality, plants must be topped (that is, removing the flowers) and suckered (removing all lateral shoots). Those plants which are allowed to go to seed produce capsules containing some of the smallest crop seed known: 380,000 seeds to the ounce is not uncommon. Leaves harvested for curing are picked by hand at the proper stage of maturity. Less select tobacco results from harvesting the entire plant. Slow fermentation of the leaves is known as curing; this may be any of a variety of treatments all of which result in a slow enzymatic breakdown of leaf tissues as well as a loss of water and conversion of stored sugar to derivatives. Five pounds of fresh leaves will result in one pound of cured tobacco. This curing process is like the aging of fine wines and may take anywhere from a few months to as long as four years for choice tobaccos.

What is the quality of tobacco that has held such an attraction for man since pre-conquest times? The United States Dispensary gives little space to such an explanation. Nicotine, nornicotine, and their derivatives which are inhaled in smoking interfere with normal transmission of nerve impulses, hence these toxic principles in tobacco are generally treated as nerve poisons. Nicotine and nornicotine are unusual in being liquid rather than crystalline alkaloids in their natural state, and are as deadly as cyanide. If one were to isolate these toxins from one cigar and administer them directly to a human being, death would result almost instantly. As important as the physiological poisoning is the psychological aspect of banishing boredom; to the Indians of the Americas, however, tobacco had a religious significance. In the lore of the North Amer-



Mayan Rain God
smoking a cloud
blowing pipe.
Palenque, Mexico.



Nicotiana rustica,
a "medicinal" tobacco
used in the 16th
century French court.

ican Indians, smoking was practiced as a peace gesture and ritualistically smoke was blown to the four winds. Among the Mayans both the Rain God and God of Night (Jaguar God) have been portrayed smoking pipes, presumably of tobacco.

Widely publicized reports on the harm of smoking has in no sense put an end to this slow mass suicide. There is no longer any doubt that smoking and lung cancer are associated in a direct cause and effect relationship and that one in ten individuals who smokes over two packs of cigarettes per day will die of lung cancer. One might ask the question, why not legally prohibit tobacco as we have done with marijuana. Anti-tobacco legislation goes as far back as 1590 when the Pope outlawed all smoking in the Vatican under threat of excommunication. More recently, over twenty states have at one time or another had laws banning tobacco or smoking; these laws proved no more efficacious than those prohibiting marijuana. Revenues from tobacco are currently over ten billion dollars annually and this statistic explains why, in spite of the absence of similar damning evidence against marijuana, legislation has made sale of marijuana a felony while slapping the wrist of the tobacco industry.

Snuffs include both the aforementioned species of *Nicotiana* and have historically included other plants, the roots or leaves of which are pulverized and taken into the nostrils. In Spanish cultures there is a belief that the heart stops beating upon sneezing and from Teutonic cultures comes the myth that a sneeze on New Year's morning will spare an individual from death that year. During the Middle Ages snuffs were given as a therapeutic measure (sternutation) to draw off the bad humours. Renaissance writers recommended such plants as sneezewort (*Achillea ptarmica*) and marjoram (*Marjorana hortensis*) to clear the brain and overcome headaches. In the herb lore of North America we find similar therapy practiced using a perennial herb known as sneezeweed (*Helenium autumnale*). All of these plants produce volatile oils in their leaves and flowering heads. Sternutation was used ritualistically for prophesying and in magical practices. Inca cultures did not cultivate tobacco, but used several pul-

verized roots according to an 18th century treatise. While tobaccos seem to represent the most common snuff in South America, Richard Evans Schultes has suggested that narcotic snuffs other than tobacco may play the more important role after increasing ethnobotanical investigation. In northern South America and in the Antilles, the pulverized seed of a tree, *Anadenanthera peregrina* (formerly placed in the genera: *Acacia*, *Mimosa*, and *Piptadenia*) forms a narcotic snuff which is sometimes mixed with tobacco or coca. It is interesting to note that this snuff, called by the Carib Indians *niopo cahoba* or *yopo* was described by Fra Ramon Paul, a monk with Columbus on his second voyage in 1496. Little did he know that it contains the hallucinogens DMT (N-N-dimethyltryptamine) and bufotenine, the latter usually found in the skins of certain venomous toads! It was Bentham, the venerable British botanist of the 19th century, who made a generalization stating that all narcotic snuffs of the Amazon that were not tobacco were *Anadenanthera*. Such a generalization slights numerous other snuffs of this vast area.

It was Schultes who, after eight years of search and research, discovered that *yakee* or *parica*, a snuff of northwest Colombia, is the resin of the innermost bark of several species of *Virola*, a forest tree of the nutmeg family (*Myristicaceae*). This resin is dried, powdered, and mixed with ash of cacao stems to form a potent psychotropic agent and sedative. Witch doctors of the Yekwana and Waika tribes use *yakee* as a divinatory, to predict the outcome of illness and to find lost objects. These colored visions are known to be caused by tryptamines which the tissues of mammals can change to DMT.

One usually thinks of snuff as pinched from an elaborate jeweled box and inserted into the nostrils with a sniff, or a pinch of the powder taken from the wrist by a stentorian vacuum. However, these are images conjured from B-films on the French Monarchy. In the Amazon, snuff is blown through a hollow bird bone (usually from a species of plover) into the nose of a cohort, or a V-shaped bird bone may be used for self administration. So varied are the accoutrements and practices that one ethnologist has

written an article on them. Ceremony surrounding the intake of snuff by Indians in the Amazon would rival a similar act in the court of Louis XIV.

We have reason to believe, from archaeological finds of pipes, etc., that the use of tobacco and snuffs predates Columbus' entry into the new world by almost 1000 years. Every imaginable form of consumption was practiced including enemas of *Anadenanthera* seed, and drinking a tobacco infusion. Payés, or witch doctors, must initiate their proteges into the ceremony of drinking this tobacco liquor while they are adolescents. By the time a payé is mature, he is able to ingest doses massive enough to poison the uninitiated. Would these practices have changed had the Indians known, as we do now, that nicotine as well as most other snuffs are poison? The answer is an emphatic, No! One of the snuffs of the Waika Indians of Venezuela is *Justicia (Dianthera)* c.f. *pectoralis*, an herb known by these people as *bolekehena* or "leaves of the spirit of death," probably indicating the awareness of the proximity to death that one experiences with most of these. And there are witch doctors of the Puinave tribe who tell of the death of one of their members from *yakee* intoxication.

In spite of edicts from kings (James the First), threats of excommunication by the Papacy, and state laws, the practices of smoking and snuffing still persist. It is as though unfathomable man has historically sought from his herb garden of the world "leaves of the spirit of death" for reasons which must remain an enigma.

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Nicotiana langsdorfii
is an ornamental
member of this
famous genus.

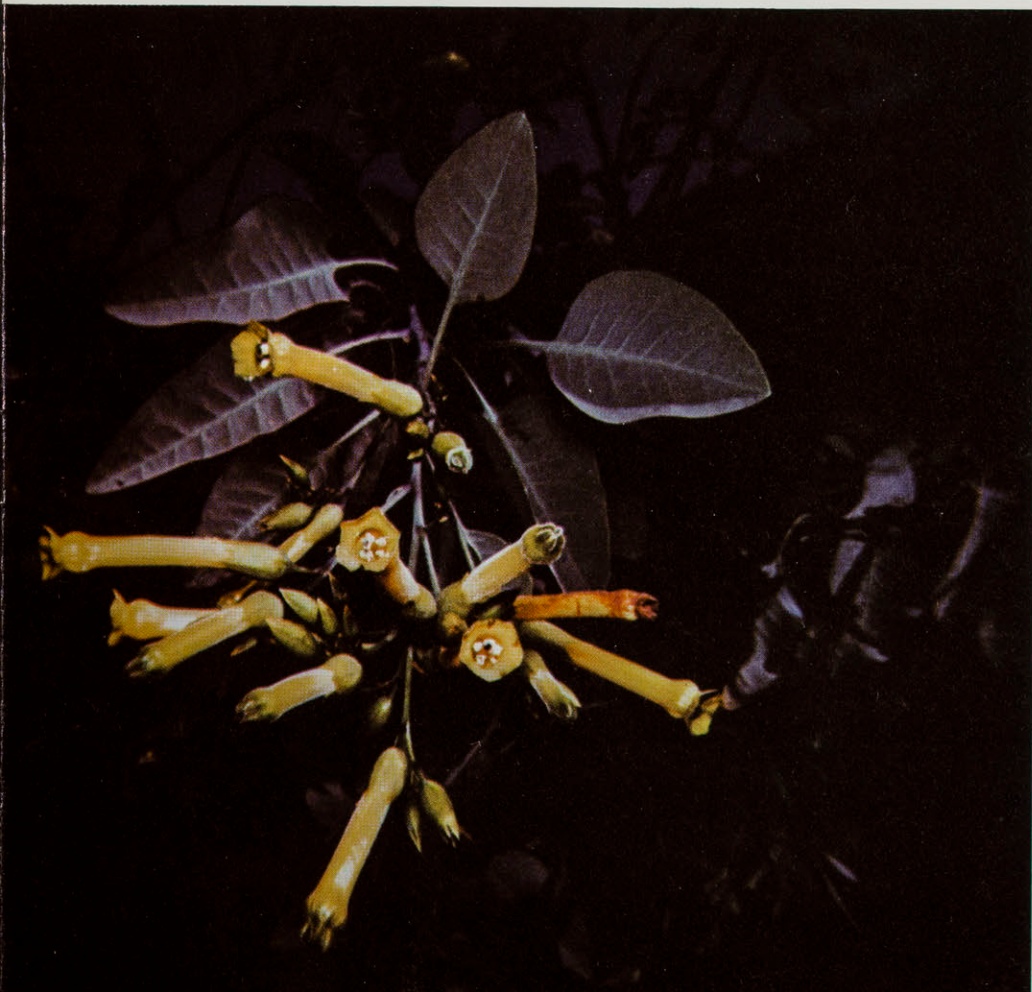
Nicotiana tabacum, the
basic smoking tobacco,
showing flowers, seed
capsules, and a basal
rosette of leaves.





Helianthus is one of the many genera used for sternutation.

Nicotiana glauca, a toxic shrub naturalized in California.





Virola calophylloidea has a resinous inner bark which is used in making the hallucinogenic snuff yakee.

Justicia (Dianthera) c.f. pectoralis is known as "leaves of the angel of death."

Anadananthera peregrina is an attractive tree producing seeds used as an hallucinogenic snuff.

THE ADVENTURE OF MINERAL COLLECTING

by Barbara V. Lowe
Curatorial Assistant
Geology/Mineralogy

A beautiful rare mineral may have a history of accidental finding, suspicious selling, thievery or smuggling that reads like high adventure. Or its history may be as bland as the mineral is not.

Acquiring fine specimens is no easy task. The Museum has been given several fine collections in recent years, and has also purchased many important specimens. Quality material is not common or cheap. Many of the finest, rarest minerals were taken out of mines closed many years ago. Older museums in eastern American cities and in Europe now have most of this material. Good specimens have often been lost by careless handling, or when unappreciative families have dumped out a relative's "rock collection."

Newer localities, still producing specimen material, are usually working mines. Miners caught "highgrading" (a fancy term for stealing) are fired on the spot. If collecting is permitted, the miner's usual technique is stow-it-in-the-lunch-box. Delicate specimens have to be carefully removed and packed to avoid chipping, breaking and bruising; accidents that would render a specimen

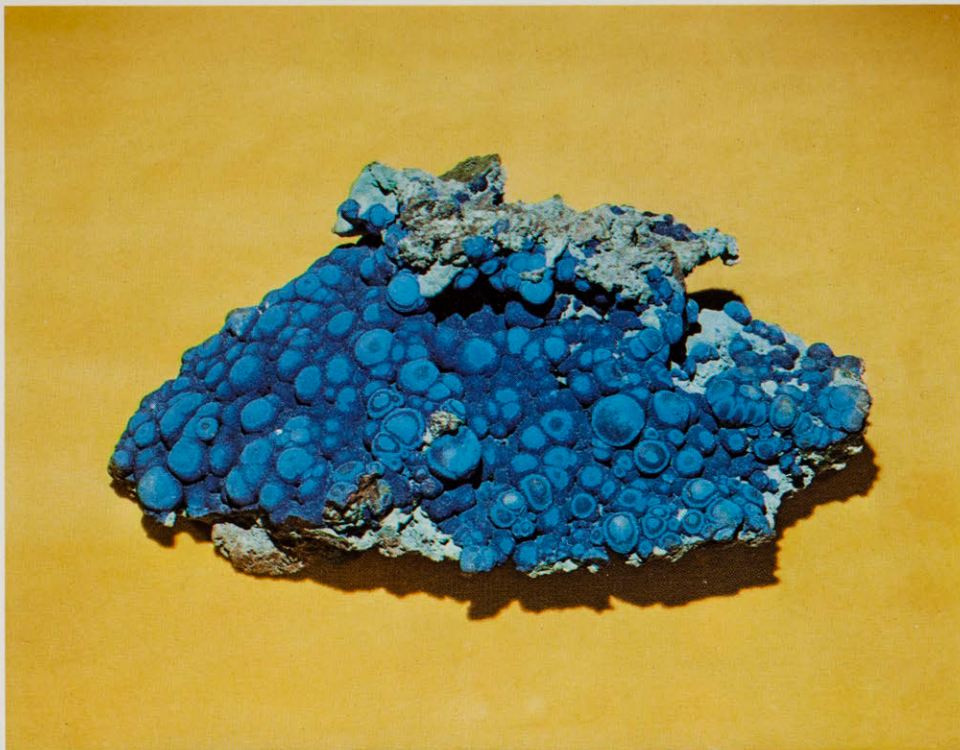
worthless.

Anything rare or beautiful attracts collectors, and today, competition for available mineral specimens has caused great inflation of prices. For these reasons, the Museum staff is most happy when someone wishes to help build our gem and mineral collections by gift or loan.

Recently we were offered two parcels of minerals from the collection of the well known radio writer, Mr. Arch Obler. He had sold his fine and extensive collection to a local mineral dealer. One parcel contained seventy major display pieces, and the other was a group of smaller rare minerals of excellent quality.

Through the interest and generosity of a member of our Museum Board of Governors, Mrs. E. Hadley Stuart, Jr. and her husband, this outstanding collection of seventy display specimens, renamed "The E. Hadley Stuart, Jr. Collection," in honor of Mr. Stuart, is now on long term loan to the Museum. Many of these fine minerals are on exhibit in the "Previews in Earth Sciences Gallery" on the first floor.

The specimens have been gathered



Azurite, small crystals encrusting beryoidal malachite from the famous Old Copper Queen Mine at Bisbee, Arizona. The specimen is 14" across and 7" wide. Azurite is a copper carbonate, formula $\text{Cu}_3(\text{OH})_2(\text{CO}_3)_2$.



Wulfenite, probably from The Old Yuma Mine south of Tucson, Arizona. The delicate crystals typical of wulfenite are well displayed by this specimen.



Bi-color tourmaline crystal $2\frac{1}{2}$ " tall, embedded in a quartz crystal, from Pala, San Diego County, California. Tourmaline is a semi-precious gemstone that was very popular at the turn of the century.

from around the world. Many are from "classic localities" (the mineral collector's term for an important extinct locality). Some specimens are exceptionally rare or have unusual histories. Now, let us take a tour of this exhibit and obtain some behind-the-mineral information.

Azurite, the beautiful copper carbonate.

Azurite is the most popular, admired and sought after common mineral. Its glorious blue color, from bright sky to brilliant royal to glossy blue-black makes it much desired by collectors. Azurite often occurs together with another copper carbonate, malachite which is grass green. The color combination of blue and green in one mineral specimen is devastating to any collector's resolve **not** to buy another azurite!

The Western United States includes several localities where outstanding specimens of azurite and malachite occurred. The Copper Queen Mine at Bisbee, Arizona was world famous for its beautiful azurite, malachite, cuprite and native copper. These large, showy specimens were found in the upper oxide zones where low grade ore had been naturally leached and re-deposited as copper-rich minerals. The old Copper Queen is now mostly gone, displaced by the gigantic hole of the Lavender Pit Mine, run by the Phelps Dodge Corporation.

Around the world, far from Arizona, is a huge mining operation at Tsumeb, South West Africa. This mine is still actively engaged in recovering copper, lead, zinc, silver and other metals. A suite of minerals from Tsumeb in huge lustrous crystals is a breathtaking display for any museum. The "Rooster Tail Azurite," pictured on the cover of the Quarterly, is a fine example of Tsumeb minerals.

Fifty or sixty years ago this particular specimen was in the Roebling Collection. In the early nineteenth century Colonel Roebling assembled the finest private mineral collection in the country. On his death, it was given to the Smithsonian Institution. Our Los Angeles County Museum of Natural History is the second museum where this beautiful azurite has resided in its travels among famous collections. There are several other specimens in the Stuart Collection which also have Roebling numbers on them.

Wulfenite, yellow, fragile and frustrating. If azurite is the loveliest of blue

minerals, then wulfenite is undoubtedly the loveliest of yellow minerals. It is a lead molybdenum mineral, chemical formula $Pb(MoO_4)$, and is therefore quite heavy. Its specific gravity (or density compared to water) is 6.5 — 7.0, but it is a soft mineral, hardness $2\frac{1}{2}$ to 3.

The delight of wulfenite is its color; yellow, yellow-brown, orange, orange-red. The frustrating aspect of wulfenite is the paper-thin habit of its square crystals. Any large wulfenite specimen that survives the miner's pick and dynamite, then peregrinates for forty or fifty years from collector to collector before coming to rest in the Museum and is **still** undamaged, must be viewed with astonishment.

Once in the Museum, the frustrating quality wulfenite hides in its pretty yellow crystals, suddenly appears to plague museum Curatorial Assistants. Previous owners, afraid of breaking crystals, may have been too timid to give the minerals a bath. However, displays of dirty, dusty crystals do not enhance Museum exhibits, so the wulfenite **must** be washed. Wulfenite sheds crystals like the proverbial long-haired dog in spring shedding hair, but crystals do not grow back in the fall.

Arizona and Mexico have produced the world's most spectacular wulfenite specimens. Mines scattered across southern Arizona, with odd names such as The Red Cloud, The Old Yuma, The Glove, The Defiance, The Hilltop, have produced the largest, the yellowest, the orangest, and certainly the most delicate and beautiful of wulfenite crystals. The Los Lamentos in Chihuahua, Mexico still occasionally produces thick tabular, yellow-orange or carmel colored wulfenite perched on dark red-brown matrix.

The first mineral collections were made in Europe, and "The E. Hadley Stuart, Jr. Collection" contains fine pieces from "classic" long extinct European localities.

England, once a great mining country, produced fine specimens of both rare and common minerals. Most mines were closed seventy-five to a hundred years ago. Old labels accompanying English specimens often date from 1840 or 1850. Both the specimens and their labels are highly prized by collectors.

Barite, the common sulfate of barium, was obtained from many mines in Cum-

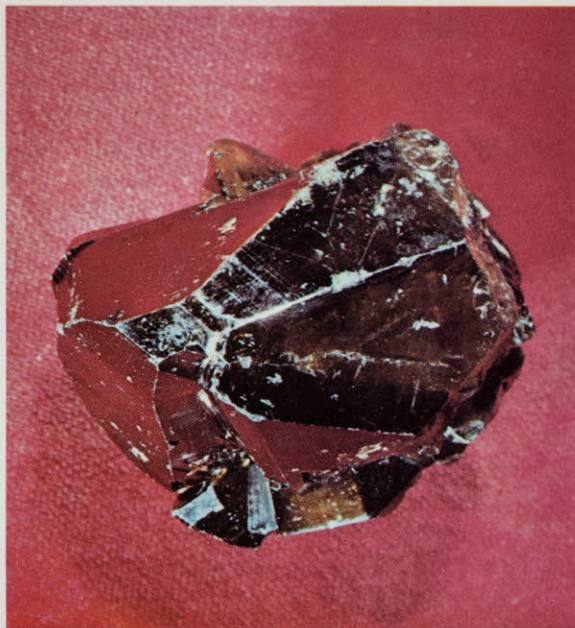


English minerals. Left: Barite, Frizington, Cumberland; Front: Center: Chalcophyllite, a complex arsenate-sulfate of copper and aluminum from Cornwall; Rear Center: Liroconite, a complex arsenate of copper and aluminum from Cornwall; Right: Bournonite a lead-copper sulfosalt called "cog-Wheel Ore" by early English miners, also comes from Cornwall.

Gypsum, variety "Selenite" from the Cave-of-the-Swords, Naica, Durango, Mexico. Gypsum is commonly used to make plaster-of-paris and occasionally in nature forms magnificent crystals such as this one.

Leadhillite (light blue) and Anglesite (white) from the Mammoth-St. Anthony Mine, Tiger, Arizona. Leadhillite is an exceptionally rare lead mineral. The back of this specimen also has small crystals of another very rare mineral, Boleite.

Pink fluorite on "Rock Crystal" quartz from St. Gotthard, Switzerland. Of all Swiss minerals, this combination is the most prized among collectors. Daring mountaineers hunt for pink fluorite and other minerals found in cracks in the rocky cliffs of the high Alps.



Cassiterite, tin oxide, from Ouro Preto, Bolivia. This single crystal, 2" x 1½", may have been smuggled out of Bolivia many years ago.



Diopside, from Renneville, Congo, is a fairly rare copper silicate. The largest crystals have come from this locality. The crystals on this specimen are up to ½".



Thorianite, a twinned crystal from Madagascar. This mineral truly belongs to the space age. Seventy years ago there was no known use for thorium and other radioactive and rare earth elements.

berland, Cornwall, Northumberland and Durham. The glossy blue-grey crystals on exhibit are from Frizington, Cumberland. Bournonite from Cornwall was mined for lead and copper. Its crystals often grow as twins in shapes that resembled the cog-wheels used on railroads and mining cars of the period, and the English miners called bournonite "cog-wheel ore." Two very rare blue copper minerals in the collection come from Cornwall. Liroconite and Chalcophyllite have been found only in three or four other copper mining areas of the world.

Two specimens, the smoky quartz and the pink fluorite on quartz, from the Swiss Alps, were probably found by the most daring mineral collectors in the world. Minerals in the Alps are found in narrow fissures that occur on the highest, steepest rock faces in that rugged mountain chain. The farmers and shopkeepers, the part-time mineral collectors called "strahler," who search the Alps for specimens, are skilled mountaineers. About fifteen years ago one man worked, when the weather allowed, for three years to open a pocket of pink fluorite and quartz. The specimen in the Stuart Collection may have come from this find.

The African continent has proved to be a treasure trove since the adventurous began seeking the legendary mines of Solomon. The copper and uranium mines of the Congo have produced beautiful mineral specimens as well as refined metals. Diopside, a brilliant green copper silicate, malachite, a green copper carbonate, and francavillite, a rare yellow uranium mineral, are unusual specimens from the African continent.

Off the east coast of Africa, from the island of Madagascar, comes the mineral thorianite. Seventy-five years ago thorianite and other minerals containing thorium, uranium, tantalum, lanthanum, cerium and other rare earth elements were in the category of "scientific curiosities." Today all areas of modern technology such as cancer research, color television, Apollo moon flights and transistorized computers make use of these rare elements.

The Americas, both North and South, have their "classic" localities too. In our own state of California, Pala, an Indian village in San Diego County, was the focus of a frantic search for gemstones.

The "tourmaline rush" as it might be called, reached its height in the first decade of the twentieth century. Tourmaline is a semi-precious gemstone that literally comes in every spectrum color, with two or three colors commonly within a single crystal. One very fine pink and green crystal embedded in a quartz crystal represents this famous California gemstone locality.

Another "classic" locality in North America is Tiger, Arizona. First mined for gold then copper and lead, this mining district is at present inactive. The Mammoth-St. Anthony mine produced some exceptional crystals of extremely rare copper-lead-zinc sulfates, phosphates and carbonates. Leadhillite, a lead-sulfate-carbonate, is reported in Dana's **System of Mineralogy** from about fifteen localities. Tiger is one of three localities where crystals of any size have been found. On the same specimen with leadhillite, are tiny crystals of boleite, a lead-copper-silver-chloride known from only three localities. Other minerals from Tiger include an azurite and a specimen combining wulfenite, diopside, and cerussite.

Mexico, our southern neighbor, seems to be a country of surprises. What is common in other places is likely to take a fantastic twist in Mexico. In the world of minerals, my nomination for Mexico's most fantastic has to go to the Cave-of-the-Swords. Gypsum is an everyday, common, well-known mineral. Any junior rock collector will be happy to inform you that gypsum is used to manufacture plaster-of-paris. However, in the state of Durango at the town of Naica, there is a mine riddled with caverns containing fantastic gypsum crystals. Most of these crystals are perfectly clear and are up to **five feet** long! This is the Cave-of-the-Swords and parts of it are preserved for the "turistas." The fine crystal on exhibit from this mine has to be considered a "miniature," being only nine inches tall, seven inches wide, three inches thick and weighing several pounds.

Collecting or buying specimens in Mexico is an experience like no other. Visitors to out-of-the-way mining villages are likely to be mobbed by children and women selling "minerales" and "piedras" (rocks). Extended bargaining ses-

sions are essential parts of the buying game.

The closing "tale" on our tour of this fine collection surrounds a rather unassuming but attractive brown crystal of cassiterite from Bolivia. Tin mining is the main industry of this high Andean land-locked South American country. Cassiterite, tin oxide is the main ore mineral.

Many years ago there was a spectacular find of brown shining cassiterite, with very large crystals, in one of the mines. It is certain the crystals never went through the crushers on their way to aid the Bolivian economy. What is not clear is exactly how and under what strange circumstances they disappeared from the mines. The specimens vanished, some say from storage in the mine manager's office, out of Bolivia. Just as mysteriously shortly thereafter, mineral collections across the United States suddenly blossomed with Bolivian cassiterite crystals.

One fine and probably errant crystal of cassiterite now resides on exhibit in The E. Hadley Stuart, Jr. Collection. We hope that from now on nothing more mysterious than curious museum visitors will look at it and the other beautiful specimens in this collection. If you have not yet seen this exhibit, I hope you will plan a visit to the Museum soon. Not only are the specimens colorful, rare, scientifically or technically interesting, but now you know that some of them come from unusual places, or were collected by daring prospectors, and if the minerals themselves could talk, they could give some pretty interesting information to customs officials as well as to Museum visitors.